

Model-based signal processing for laser ultrasonic signal enhancement

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A model-reference approach is developed to enhance signals generated from laser ultrasonic systems. A thermoelastic model of laser generation and subsequent ultrasonic wave propagation calculates surface displacements of a specimen. The model response is used as the reference signal in an optimal signal enhancement scheme. Both fixed and adaptive processors are considered. They show that a significant improvement in signal levels can be achieved over the usual methods. These processors have enhanced noisy data acquired from a Michelson interferometric measurement system and increased its overall sensitivity.

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